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# East Europe Report

## SCIENTIFIC AFFAIRS

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# EAST EUROPE REPORT

## SCIENTIFIC AFFAIRS

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# PHYSICISTS DISCUSS PRESENT, FUTURE WORK AT CONFERENCE

Prague RUDE PRAVO in Czech 29 Aug 79 p 4

[Article by engr. Stefan Zajac, Candidate for Doctor of Science, secretary of the preparation committee for the Sixth Conference of Czechoslovak Physicists in Ostrava: "Physics, the Foundation of Modern Technology"]

[Text] From 27 to 31 August the Sixth Conference of Czechoslovak Physicists is taking place at the mining college in Ostrava. More than five hundred physicists are taking part in it, from workplaces of the Czechoslovak Academy of Sciences, the Slovak Academy of Sciences, colleges and departmental research institutes. There are 17 papers on the program about prospective directions in physics, especially from the viewpoint of application in technological practice and 360 specialized contributions devoted to current problems of basic and applied physics research.

Since 1969, working conferences of Czechoslovak physicists have been held regularly every two years, always in a Czechoslovak city in which there has been concentrated an important research center in the field of physics. At these conferences, Czechoslovak physicists present their results through which they share in the realization of the decisions of party congresses. The principal organizer of these conferences is the Physical Scientific Section, which was created in 1969 within the framework of the Union of Czechoslovak Mathematicians and Physicists in cooperation with the newly founded European Physics Society. The past five working conferences have been marked by an ever growing number of participants and discussion topics.

This year's Conference of Czechoslovak Physicists in Ostrava is taking place under the slogan Physics, the Foundation of Modern Technology. Our public is aware of the results of Czechoslovak physics research applied in practice, especially in our electronics in the production of magnetic materials, diamonds, low temperature apparatus, lasers and in the construction of nuclear power plants. From the papers at the Ostrava conference it is possible to cite several current examples of how our physicists share in the contemporary and future tasks of our technology. For example, the results which have been achieved in the study of

thermodynamic process in mines relates directly to the safe extraction of coal. According to the current needs of metallurgy, physicists have worked out metallurgical methods for the strengthening of martensitic, high-tensile steel and researched possibilities for the use of low temperature plasma in metallurgy. The lowering of the cyclically magnetized losses from transformer plates, which had been the subject of complex physical study, has great significance for electrotechnical practice.

Additional papers at the conference are devoted to the conservation of energy and especially concerning current sources, forms of release and the effectiveness of energy utilization, with emphasis on solar energy. The present technological task is to utilize much more energy from the sun for civilization than previously. A paper on bioenergetics shows how effectively transformations of solar energy take place in nature, for instance in photosynthesis. Papers about the physical problems of kryosurgery (achieving healing effects by freezing diseased tissues) and about the biological effects of ionized particles and their use in radiobiology and radiotherapy are convincing examples of the possibility of a direct link even of the most basic physical research to current social needs.

There are also summary papers at the conference from the "front line" of physical research, that is concerning efforts to unite a theoretical description of all basic physical interactions and about relativistic effects in atomic physics. Our physicists are significantly sharing in this area of physics research above all through extensive participation in the programs of the United Institute for Atomic Research in Dubna in the Soviet Union. For the first time in the history of the conferences of Czechoslovak physicists, a paper has been presented about the cosmic technology of new materials, which draws information from the measurements which the first Czechoslovak cosmonaut, hero of the Czechoslovak Socialist Republic and the Union of Soviet Socialist Republics, V. Remek performed last year while on the orbiting station Saljut 6. Specialized papers at the conference are concentrated in groups according to professional specialization. The great majority of them are devoted to questions of the physics of solids, atomic physics, the physics of elementary particles, plasma physics, chemical physics and biophysics. It is possible for authors to display materials related to individual contributions on bulletin boards, which makes for much more effective discussions between interested workers from various physics work places from the whole republic. And this is one of the main goals of the conference.

At the conclusion of the conference the preparation of a statewide plan of physics research in the Seventh Five Year Plan in the CSSR will be discussed. The main goal of physics remains to constantly deepen our basic knowledge of nature and to aid in its current and prospective application in social practice. In this manner physics will contribute ever more to the scientific-technical progress of our whole society.

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## TRENDS IN RESEARCH, DEVELOPMENT ORGANIZATION ANALYZED

West Berlin DIW-WOCHENBERICHT in German Vol 46 No 27, 5 Jul 79 pp 281-285

[Article produced by German Institute for Economic Research: "New Trends in the Organization of Research and Development in the GDR." JPRS translations of articles cited in various footnotes of this article can be found as follows. In TRANSLATIONS ON EASTERN EUROPE--ECONOMIC AND INDUSTRIAL AFFAIRS: Footnote 1, see 69036, 3 May 77 pp 23-40; footnote 2, see 71154, 22 May 78 No 1753, pp 89-119; footnote 3, see 72771, 6 Feb 79 No 1850, pp 20-25; and footnote 8, see 72080, 19 Oct 78 No 1802, pp 42-49. In TRANSLATIONS ON EASTERN EUROPE--SCIENTIFIC AFFAIRS: Footnote 7, see 73460, 16 May 79 No 628, pp 19-24; and footnote 11, see 72164, 1 Nov 78 No 605, pp 6-16]

[Text] The steadily rising international standard of research and technology also forces the GDR to a constant scrutiny and updating of procedures and products for its industry to remain competitive in export and in order that its merchandise does not fall too short of growing consumer demands on the domestic market. "Comparison to world standard" became therefore an often heard catchphrase in political discussions in the GDR. Because of foreign exchange and embargo problems, however, technical progress can be guaranteed only to a limited extent by the importation of licenses and patents. Instead, the task at hand consists of stepping up domestic research and stimulating it by constant comparison to and competition with international results.

Technical progress, efficiency and automation depend on more than just the results of the actual research. They are also determined by the implementation of the technical know-how in the production process. This appears to be the crucial bottleneck--as can be gathered from GDR discussions: High-level planning decisions, e.g. regarding capital investments and the determination of the production program, regimentations, bureaucratic and time-consuming planning mechanisms often staunch the eagerness of plant managers to innovate and to take risks. Plant evaluations which are oriented towards short-term

production results have similar effects, considering that from the plant's point of view, continuation of the usual production is safer than any new development which brings with it risks and problems.[1]

It is pointed out in the GDR that technical progress makes an essential contribution to the relief of the critical employment situation. Increase in productivity through new methods of procedure and production have always shown to lead to a "savings" in the workforce. Only in rare cases is it likely to lead to an actual reduction in the work force.

## Points of Emphasis in Research and Development

Expenditures for research and development in the GDR--from the state budget and from enterprise funds--appear annually in economic plans and commentaries to consumer budgets. Especially towards the end of the 1960's, when technological progress was given more emphasis, these expenditures increased considerably: in 1965, only 1.8 billion marks or 2 percent of national revenues was spent; in 1972 it was 5 billion or 4 percent. The percentage has remained approximately constant since then. It has been noted in scientific journals that an increase of this proportion could not continue.[2] Instead, an attempt is made to achieve a greater level of efficiency in research and development, to concentrate on points of emphasis and to assure a more rapid implementation of the results.

The most important tasks of research are:

- Development of products suitable for the "world market,"
- The lowering of raw material- and energy consumption,
- The upgrading of industrial goods for the domestic market.

The "State Plan for Socialist Rationalization" which was introduced in 1979 as the new planning instrument, also shows points of emphasis on technology. Enumerated are especially microelectronics, the rationalization of transport, turnover, and storage processes, manipulator- and industrial robot technology, the use of highly productive technologies of metal working as well as the use of microbiology.[3] This part of the plan lists primarily technologies which help in raw materials savings: There is no doubt that the GDR--on the international scale--uses too much in raw materials and energy in production--a fact which, because of constantly rising prices for raw materials, creates additional--and avoidable--export problems.

## Strengthening Research and Development in Combines

The forming of combines, accelerated for the past two years, presumably is decisively motivated by the still unsolved problems of technological progress. The former relatively strict separation of research and production had led to noticeable losses due to friction in setting tasks and transfering the results into practice. During the formation of combines, research capacities (e.g. installations of the Association of State Enterprises (VVB) or other larger

research institutes) were incorporated into the combines, and their existing research capacities were enlarged. As a result of this continuing process, a concentration of three-fourths of the total GDR research and development potential in the combines could be registered by early 1979.[4]

A number of expectations are tied to this central research strategy:

> Strict uniform administration of research and development, as well as planning by the combine management, centralization of financial, material and personnel resources for science and technology, quick reaction to technological changes in the individual combine enterprises through a uniform research strategy by the combine leadership;
>
> Realization of basic technological changes which demand more preparation and time until implementation and might involve more risk;
>
> Reserving of capacities for the technical-experimental transfer;[5]
>
> Advantages of cost reduction in research and development (economies of scale), especially through better utilization of complex testing installations and laboratory equipment.

This concentration of research activities in combines, however, does not mean the complete cessation of all central-institute industrial research. Some central institutes will continue to do certain research tasks which involve more than one particular branch or industry. Especially significant are, e.g., the Central Institute for Welding Practice (in Halle) and the Institute for Lightweight Construction and Economical Use of Materials (in Dresden).

Research in Academies and Technical Colleges

Outside of industrial institutes, research in natural science and technology is pursued at the Academy of Sciences (AdW) and at technical colleges. Since 1973, these institutions have again become predominantly responsible for basic research financed out of the state budget. In contrast to the time from 1968 to 1973, when this field was also dominated by contracts, academies and technical colleges are now no longer oriented towards the interests of industrial contractors whose goals are short-term, economic gain. Only about one-third of the academic research pursued at present is based on contracts.[6] But it must not be overlooked that even basic research is a solid part of central scientific planning and is oriented towards fulfilling basic economic needs.

In the beginning of 1979, a total of 18,700 workers were employed at the Academy of Sciences; three-fourths of them presumably work for the Institute of Natural Sciences and Technology. In order to bring academic research closer to practice, the focus is to be on technological and "application tasks" even in basic research. Approximately 60 percent of the research personnel is employed for research with "technological effectiveness."[8] The increase

in technical equipment of the Academy of Sciences (apparatus, equipment for research, scientific instruments, research installations, model workshops) is to have priority in budgeting.[9] The Academy of Sciences is to do without their own research installation in all cases in which industry already has the appropriate capacities at its disposal.[10]

Essential weaknesses of basic research are pointed out by Academy of Sciences president:[11]

> Too much extrapolation of economic trends instead of a derivation of future-oriented, basic changes out of the own theoretical or experimental research;
>
> "Too few above-average scientific results which influence larger areas of research, affect entire segments of the economy and stand up to international competition;"
>
> Routine investigations which merely lend a finishing touch or improve already existing results by only minor details.

Also pointed out is the difficulty of creating a balanced relationship between basic research and applied research. Warning is given of extremes in the pursuit of pure theory on the one hand and solely of practical purpose on the other.[12]

In technical colleges, the scientific-technical potential's point of main effort is to be on the economy. Critical comments--e.g. by the Minister of Higher Education--show that even the level of college research is still not quite up to international standards.[13]

In 1977, the GDR employed approximately 80,000 persons at universities and technical colleges.[14] When making a comparison to the Academy of Sciences, one must consider that most of those in the colleges are employed in the field of humanities; and that professors do research only on a part-time basis. Approximately one-third of all man hours is considered to be spent for research in GDR technical universities.

Cooperation and "Intensification" in Research and Development

In recent years, various kinds of organizations have been developed in order to make better utilization of research facilities. The necessity for this comes from the increasing subtlety of experimental methods and techniques. Constructive and technological research is becoming more and more capital-intensive because there is an ever increasing need for research equipment. That part of the equipment which is only less than one-fifth of the industrial research technology, worth more than 20,000 marks, is being used on a co-operative basis:[15]

> A better utilization of expensive equipment is to be made possible through "user associations, also for those not associated with research institutes;

"Methodological-diagnostic centers" at institutes of the Academy of Sciences and at technical colleges are to work in areas in which equipment rental without the personnel to operate it is not possible due to the complexity of the research technology;[16]

Research associations a... to work on joint projects.

Additional forms of collaboration are cited: joint "service groups" between the Academy of Sciences and the universities for service and maintenance of especially valuable imported equipment, (e.g. the service group for ultracentrifuges and spectrometer in Berlin-Buch), joint testing plants, regional "science coops" (at present in Freiberg and Jena Kreises and in the Karl-Marx bezirk, consisting of university and industry groups). It is, however, not possible to estimate the extent of cooperation arrangements.

In order to improve communicaiton between research institutes and industry, "academy-industry-complexes" were formed i. 19.. and are propagated for the purpose of collaboration between industry and research institutes of the Academy of Sciences in the areas of technical microbiology, organic highpolymers as well as pharmaceutical research. The research cooperation between the "Fritz Heckert" tool combine and Karl-Marx-Stadt Institute of Technology was increased in 1979 and is now cited as a comprehensive "institute-industry complex" in the field of machine building.

The "intensification" of research and development is also being justified by the fact that the demands made on research increase faster than the resources for research. Besides the cooperation in research described above, the following means to achieve better results are cited:

Building up of the technical information and documentation system. Under the administration of the Central Institute for Information and Documentation (with approximately 300 steady employees), there exists an "information system for science and technology." Research institutes are to get complete information about technical developments from this central bank;

Forming of "transition collectives" which have the task to coordinate research, planning, design, technology and financial planning, and are composed of members from certain enterprises, research institutes, suppliers and other cooperation partners;

Increasing demands on research itself regarding work that is always of high quality and completed on time: precise planning and budgeting as well as quality control guaranteed by a 1977 regulation.[17]

Planning Tools

Precise planning is required in order to move completed research and development projects into production. Disproportions occur again and again because

of bottlenecks, especially in testing rooms, pilot projects, model workshops and in the budget. Attempts have been made in the past to overcome such bottlenecks through central planning. But this is still in the experimental stage. The "target-program-method" has been propagated since 1978. With this method, all relevant points of view regarding an innovation project--beginning with research--are to be coordinated as a uniform complex, independent of the respective administrations. Program planning then becomes binding through so-called "government contracts:" These contain, starting with the end product, all necessary planning data for research, development, investments, sub-contracting, materials supplies and marketing. Certain economic structural changes, e.g. the introduction of microelectronics, are also to be effected in this way. Thus the planning of research and devleopment, which until now often concluded with the production of a model or of a pilot series, is to be expanded to include the production process. By thinking on a broader scale, a better solution to technological key problems is hoped for.

Antiquated Production Methods

When introducing new products, an essential problem is the fact that capacities in important areas of the tool and rationalization industries cannot be expanded sufficiently. These capacities are already fully utilized in the building of equipment, the repair and building of instruments for existing production. Some of the methods employed are antiquated. In this way--it is often lamented--not only man hours and materials are wasted, but also transition capacities for new products are reduced or even blocked and innovation considerably delayed. The director general of Robotron Combine pointed out only recently that there could be conflicts in certain situations if the capacities for the production of actually necessary instruments for transition of new products no longer suffice because of the supply of replacement instruments stipulated in the contract.[18] In addition, a series of new products cannot reach optimal size when the assortment structure is antiquated.[19]

Summary

While competition in economy forces innovations in product and procedure, in the GDR economy the state must intervene in order to initiate technical progress in production through bureaucracy in the economy and through central planning. In spite of refinements of administrative techniques and partial improvements in organization, the various negative consequences of the centralized planning system for realizing technical progress have not been worked out. Whether the concentration--by forming combines as well as by limitation to certain areas of research--really leads to the expected success in the long run remains in question. Concentration, on the one hand, prevents duplication of research efforts and dissipation of forces on too many splinter projects, but increasing concentration on the other hand endangers the industry's readiness to make innovation. The central office is no longer in a position to compare the achievements of various industries.

In addition, technical knowledge can only be imported on a limited scale, considering the critical trade balance. But even in cases where foreign

licenses can be obtained, these are not always used optimally because the technical know-how or the technological basis necessary for application are missing due to neglect in particular areas of research.

Footnotes

1. Increased profits for newly developed and improved products barely helped, because the utilization of these profits is extremely limited and does not lead to higher income for investors. See Manfred Melzer: "Price Control and Price Politics in the GDR" VIERTELJAHRESHEFTE ZUR WIRTSCHAFTSFORSCHUNG (Economic Research Quarterly) No 1, 1977.

2. See WIRSCHAFTSWISSENSCHAFT No 4, 1978 p 400.

3. See EINHEIT No 1, 1979 p 35.

4. See NEUES DEUTSCHLAND 26 Jan 1979 p 5.

5. Large experimental installations are considered necessary where the risk of error in scale conversion from laboratory or small experimental installations is to be minimized and where refinements in technological procudures are sought. It is generally presumed that scientific technology will expand more rapidly than scientific personnel in the next few years. In fields which involve a great deal of research, like chemistry, already now up to 10 percent of all employees work in research and development. See "Economic and Social Problems of Scientific-Technical Progress" Berlin (East) 1978 p 201.

6. In first place, with 30 million M in annual contracts each, are the fields of chemistry and electrotechnology/electronics. See NEUES DEUTSCHLAND 26 Jan 1979 p 5.

7. See SPEKTRUM No 1, 1979 p 7. In 1974, 155,000 were employed in research and development in the GDR. For academic research, only the following, incomplete data are available: projected rise in the number of workers from 1976 until 1980, approximately 3,000; increase of capital investment approximately 160 percent; value of total investment in installations and equipment more than 1 billion M; long-term goals for 1974 to 1990 are: increase in number of workers by 60 percent, tripling of capital investment. Capital investment of the Academy of Sciences and universities should have amounted to 518 million M in 1978.

8. See DIE TECHNIK No 9, 1978 p 478.

9. See SPEKTRUM No 6, 1976 p 10 ff.

10. See EINHEIT No 4, 1979 p 390 ff.

11. See SPEKTRUM No 7, 1978 pp 5 ff.

12. "Application of Scientific-Technical Progress in Industry" Berlin (East) 1978 p 16.

13. See DAS HOCHSCHULWESEN No 9 1978 pp 223 ff.

14. STATISTICAL YEARBOOK 1978 p 314. 32,400 professors and scientists worked in universities and technical colleges at the end of 1977. See DAS HICHSCHULWESEN No 7, 1979 p 1. The following increases were known for 1979: capital by approximately 7 percent, equipment by 20 percent, employees by approximately 1.5 percent expenditures for science and technology approximately 3 percent. See DAS HOCHSCHULWESEN No 10, 1978 p 255.

15. See EINHEIT No 5,1979 p 504.

16. Example: The methodic diagnostic center for nondestructive testing at the Otto von Guericke School of Technology in Magdeburg (See DAS HOCHSCHULWESEN No 11, 1978 p 308).

17. Guidelines for the development and continued development of products, procedures and technologies. GESETZBLATT der DDR, Part I, 1977 pp 145 ff.

18. See DIE WIRTSCHAFT No 5, 1979 p 5.

19. See W.D. Hartmann, H.D. Haustein: "The Administration of Industrial Research and Development" Berlin (East) 1979 p 98 f.

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STATUS OF COMPUTER INDUSTRY EVALUATED AFTER U.S. TOUR

Budapest VALOSAG in Hungarian No 8, 1979 pp 96-102

[Interview with Janos Kazsmer, director of VIDEOTON Computer Factory, by Laszlo Gorombolyi; date and place not given]

[Text] It is well known, it is a fact which no one would now dispute, that a modern economy cannot be imagined without a high level of organization or without computers, the modern tools for organization. It is also well known that from the very beginning the greatest power in computer technology has been the United States of America. Several months ago, Janos Kazsmer, director of the VIDEOTON Computer Factory, visited the US. In our conversation after his return it was unavoidable, of course, that general questions of our economic life came up, for the computer technology industry is part of the Hungarian economy and those laws and trends which are valid for our economic life as a whole are also valid for this branch of industry.

[Question] What was the purpose of your trip?

[Answer] We visited America, for two weeks, to carry on business talks. In the meantime we had an opportunity to visit factories, we could study the structure of certain firms and the developmental achievements.

[Question] In your view, in your trade, is America an unattainable dream or simply a competitor?

[Answer] Everyone will expect me to say that we must bow down before American technology, that competition with them is hopeless. And yet I say that this is not true.

[Question] This is rather surprising, since we are talking about computer technology. Can VIDEOTON, for example, start competing with IBM, without anything further?

[Answer] We must distinguish sharply between two things. One is the question of equipment. I am thinking here of a computer, display or line printer. The other is the question of parts. It is easy to answer in regard

to the latter—there is simply no comparison because there is practically no modern parts in Hungary. So there is no basis for comparison with the completely automated factories of IBM manufacturing, integrated circuits. The gap here is gigantic. But in the case of complete equipment our situation is not at all hopeless. If we look at the displays or line printers of VIDEOTON or at the computer just beginning to be manufactured, they can be compared to the line printers or displays of CDC or IMB. The technical level of this equipment is nothing to be ashamed of. The same can be said of manufacturing conditions—the VIDEOTON factories could be moved to America. The factories are modern, they have the same technological structure as those in America, we have good equipment and machines.

[Question] It is a pleasure to hear it. But are there really no differences?

[Answer] Unfortunately, there are. They are far ahead of us in the organization of training, in work discipline and in the organization of work.

[Question] So this means, for example, that our school system is bad?

[Answer] It is not my function to answer that, and I am not talking about state education. It must be admitted that the information acquired in school is sufficient for the general professional culture. But it is not sufficient for someone to be able to perform his work, a given task, well. This usually requires special information the acquisition of which we cannot entrust to the individual. I found in America that training is a part of enterprise activity, just like production or technical development. They have institutions devoted exclusively to training--with class rooms, tools and high ranking professors. And there is another thing. If we have a task which is a little more complicated we entrust it only to a college or university graduate, to an engineer. It is not al all the same there. One example. In the integration of the large IMB computers--when a central unit is combined with peripherals into a system--only 10 percent of the employees are college graduates. The rest are secondary school graduates with 2 years of special training. When we do the same work 80 percent are college or university graduates. It hardly needs proving that secondary school plus 2 years of special training is a lot cheaper than university training. Especially if we calculate all this at the level of the people's economy.

[Question] There is also internal training in most factories in Hungary?

[Answer] Yes, we have created our training network; there was a government decree on it. We did it an yet we didn't do it. So that our statistics would be good we included even political training as part of the training. And general foreman and leader training, etc. And we thought, Boy, are we training well. But we didn't do a thing in the world in real professional training. We should try to transform our training network--if you like, on the American model. We are setting up special courses and making them compulsory for those working in the areas affected. But we must talk about

the other side of the coin. We are now providing training under terribly bad conditions. In a corner of the factory, in an office, we force 25 into an area that could handle five comfortably. We are including training aids in our next investment plan—obviously as a function of our material possibilities. It will take time to reduce this tension but until then we must provide training even under bad conditions.

[Question] The other difference, as you said, is discipline.

[Answer] In general we think that the world of "Modern Times" still lives in America--a person stands on the production line all day and turns a screw. As if there were military discipline--a bell rings and they eat, a bell rings and they go to the bathroom. It is not that way. In our profession--and I think this is not rare elsewhere--leisure is as much a way of thinking as here. But in addition to leisure there is a conscious discipline which must be adhered to, which has strict rules. And this discipline turns the vectors inward so they are all oriented in the same direction. It would be a mistake to think that all this is simply the result of the merciless force of unemployment. There is unemployment in America, certainly; they write articles about it there too and we know about it. But in addition I saw notices in the factories--Bring in this or that type of specialist and you win 300 dollars a head. And there are lists of winners--X.Y. has brought in three employees and has won so much money and the plant chief has won this or that extra award. I found a shortage of manpower in every American factory I visited; everywhere they are looking for good e experts. Despite this, I say that the level of discipline is substantially higher than here. We must make progress in this respect too.

[Question] Who must, exactly?

[Answer] I say that the fault is not in the employee but in the leaders. If they do not demand something, we are human, even I would take the easier way, and so do others. If the leaders are not demanding then discipline is as we see it here today.

[Question] The problem of the leaders is the important difference you mentioned as the third one, work organization.

[Answer] They turn much, much more care to planning procedures than we do. It may be that preparation for a task takes 2 years while effective execution of it takes 6 months. But then it is executed with certainty and there are no disturbing factors. It is often the other way around here. We imagine an organizational task--with a little exaggeration--as if we could spend 5 minutes on developing the principles and then we spend 3 years on development. And even then nothing is accomplished. I may seem to be griding my own axe but it must be admitted that in the present intensive phase, which we must have, this organization cannot be realized without computers. A relatively simple problem: Production guidance at the shop level, at a level competitive with American requirements, cannot be done

without a computer. When I say this I am laughing and crying. I am laughing because I know that, if not next year then within 2-3 years, domestic computer technology demand will increase. I am crying because the increase in demand will be in vain; we are very, very far from having the conditions for the operation of a computer at the high level we see everywhere in America. Can we create these conditions in a short time? I am rather sceptical in this regard, because of the professional level and because of the disciplinary situation.

[Question] Economic leaders returning home from western visits frequently recount experiences similar to those you have reported. Why is it that these examples do not have an effect on improving domestic conditions? At least not to the desired degree, the degree which might be expected...

[Answer] We have not developed in this respect in the last 6-10 years. We have regressed.

[Question] How do you mean?

[Answer] There has been a certain "liberalization" in society as a whole. It is indisputed fact that we have achieved very many nice things, we have developed in very many areas, but in addition we can see, and we are part of, a liberalization in public thinking. In every area. Obviously this general process has an effect in the industrial sphere also. And naturally the manufacture of computer technology is no exception. We can find here the same phenomena--although in a different form--as, let us say, in the food stores or in service in the shops. It must be admitted that a society has a general level. The professional level, the tranditions, are part of this. Certainly there are stages of revolutionary development, but it is a fact that it is very difficult for countries which started a good bit later to compete with a country which had developed factory experience 50 years earlier. When we will be able to significantly reduce this difference depends on the general morale in the country. I am not saying that we must always remain behind the developed countries. But it must be admitted that we cannot bridge this gap over night. And this brings us to the mission of the leaders. They must see that such a gap exists and that it can be removed only with deliberate, very hard work. So they must set much higher standards for themselves and for their employees. Our leaders do not yet feel this mission consciously. At least not all of them do.

[Question] When can we expect every leader to feel his mission?

[Answer] What I am about to say may sound a little odd. The economic difficulties which we can feel throughout the economy came at a good time. Because they woke us up. And that process which has begun, the struggle to master our economic difficulties, will hopefully bring results. Life, everyday life, is forcing the leaders to go in an entirely different direction.

There have to be results, better results. And these can be achieved only if both the moral and professional level improve. Of course, it is a problem of conscience for everyone--for myself as well--why this had to wait until the economic difficulties reached such a magnitude.

[Question] Will those economic leaders who earlier were incapable of recognizing what had to be done be capable of execution now that the way has been shown?

[Answer] We have faith in development. I think that the majority of the leaders will be capable of it. There will be some who are not, and they must be replaced. It makes no difference whether I am involved in this or whether another is. This is a social process which no one can oppose. We must get used to the fact that intensification will bring changes in leadership too. But I have faith that the great majority of leaders are capable of recognizing this.

[Question] And does recognition guarantee successful execution?

[Answer] It is not so simple. Take my case. Let us suppose that I have recognized what must be done. I must convert 3,500 people. Even if I break my back I can accomplish nothing alone. I need partners. I must convince 600 people who are in some sort of leadership position. Then every one of them must convince 5-6 people, turning them in the direction we desire. It is no small problem to convince 600 people. I do not want to deal in phrases but the various social organizations have a very great significance in this. The party, the trade unions, the KISZ. The forums of factory democracy. There is a great strength in the social organizations which must be deliberately used for this purpose.

[Question] The arguments are persuasive--the industrial level cannot be separated from the general level of society. Recognition is in vain and people can be changed only gradually, over a long time. But still there are factories in Hungary today which come up to the expectations in every respect. The most often cited examples in industry and agriculture are the Raba factory in Gyor and the Babolna State Farm.

[Answer] Because there was demanding leadership there which could mobilize the lower levels to force the process of development.

[Question] Does this mean that development depends on individuals or that we have very few talented people?

[Answer] Talent is a very comprehensive concept. There are many talented people. But among the talented people there are very few leaders who, on the one hand, will take risk and, on the other hand, have a sphere of authority permitting them to take risk. You count them on the fingers of one hand, in the entire people's economy. It is in vain for someone to take risk, it is in vain for someone to be talented if he has no authority. Then he can do nothing.

[Question] May I ask how many of these three factors you have?

[Answer] I cannot judge that without prejudice.

[Question] Let us seek a standard for an easier judgement--work and the results of work. We might begin with this, the VIDEOTON Computer Factory, as a representative of a new branch of industry, did not start with obsolete machines or rooted, fatal traditions. Have you exploited this advantage? Was it an advantage?

[Answer] We really did start from nothing at the end of the 1960's. It followed from this that our equipment represented, in general, the level at the end of the 1960's. This was a great advantage as compared to those enterprises which had been in operation for 20 years and inherited the fetters of 20 years. But the force of production consits of two parts--the tools of production, the dead conditions, and people. In regard to the latter we inherited nothing. And we represent the consequences of this. One example. About 50,000 program conditions each month must be met for computer technology manufacture at VIDEOTON. We had no experience in how to handle such a volume of program conditions so that the entire process would be flexible while creating conditions for planned and disciplined work. We recognized that something was wrong 7 years ago and we have been agonizing over a solution for 6 years. Nor can I say that we have found the right solution yet. We asked them in America, How do you do it? It turned out that they had been through the same thing. They made the same mistakes and found the same solutions. But they have come a long way since 1930, when they started to deal with these problems. The results of this led to a solution of the problems long ago.

[Question] Was it necessary, is it necessary for us to travel the same road?

[Answer] It would not have been necessary. But then we would have had to buy licenses and know-how which would have brought this information with them. This would have cost 2-3 times more than we spent on technical equipment alone. There are mat rial limitations. Of course, it is also true that when making decisions we often underestimate the significance of organizational methods. We say, we will learn. Wonderful. This is more difficult to learn than is the use of technical equipment or the design of new equipment.

[Question] If the factory had purchased the know-how at that time would not the investment have been repaid?

[Answer] This is a difficult question because we can talk here only of the profit not earned. You see, our activity was not at a deficit, it was very profitable. But if we think back over the past 10 years we might say that it could have been even more profitable.

[Question] How far did you get without the know-how? I am thinking that the road traveled might be measured in light of the results of the business talks in America.

[Answer] In our profession, computer technology, we generally regard America as a country where the most advanced solutions are born, where they produce, by my estimate, 70 percent of the computer technology equipment in the world. We might think that Hungarian industry has nothing to offer here. This is not true. America could be a market for Hungarian industry also, naturally in a well selected sector. In the case of computer technology this requires, before all else, a partner who is also dealing with computer technology. Without such contacts it would be in vain to go to America, or anywhere else. Because it would take so long for someone to break into the market independently that we could not wait it out, and we could not guarantee the conditions for it. Of course, this cooperation should not be imagined as our making an offer of several million or several tens of millions of dollars and they accept it. The goal can be approached only by small steps.

[Question] What were the "small steps"for VIDEOTON?

[Answer] As in so many places in the world there is restricted precision engineering capacity in America. So first of all we offered parts and sub-assemblies which can be produced with precision engineering. We started by producing for Data Product the letter cylinders and paper tractors for line printers. CDC and IBM had similar needs. This was the first step. This brought in marketing possibilities worth several million dollars per year. It must be said also that this sort of marketing--from the viewpoint of generating foreign exchange and from the viewpoint of specific expenditures--is by far the most economical. In the meantime the partners get to know the enterprise. They get to know what it is capable of and what potential it has in regard to technical and delivery capabilities. If the experiences are favorable then the partner relies more on VIDEOTON. For example, Data Product has asked for plastic parts, printed circuits and assembled printed circuits in the future. And finally, the third step, which we are talking about now--we will create joint undertakings to market complete displays. VIDEOTON would manufacture them and they would be sold in America and on all those markets where Data Product operates.

[Question] Does this method work in general on capitalist markets?

[Answer] The characteristics are a little different on European markets. Here we can start with complete products at the first step and the first "little steps" are not always necessary. We were able to enter the FRG market with our displays last year without any prior cooperation contacts.

[Question] Even if production cooperation is not necessary, certainly trade contacts are necessary.

[Answer] Of course. Market success cannot be imagined without an expansion of trade activity. The fact that we were able to place our displays in the

FRG is due to the fact that we succeeded in signing a long term agreement with an enterprise which has 21 branches and offices and a well developed distribution network in Western Europe. It is easy to imagine that we might achieve success through this network. It can also be imagined that if a single Hungarian went to the FRG for a year to try to sell displays the mission would probably fail.

[Question] So which road is ultimately more favorable in winning markets, in marketing goods produced: Production cooperation as in America, trade contacts as in West Germany or the possible creation of an independent network? It is obvious that the partners are not placing the products of VIDEOTON on the market as a kindness.

[Answer] How to get on the market differs from market to market. It is very difficult to cooperate with any well known manufacturer in Western Europe. Because the going concerns--Siemens, ICL--do not need VIDEOTON. We have had talks--supported at a very high level--with Siemens. But they came to a deadend. The factories of Siemens are working about two-thirds capacity. Under such circumstances they cannot give work to Hungary--because ultimately that is what cooperation is about. They cannot do so for economic reasons and they cannot do so for trade union reasons--which is actually a political question. But closer cooperation with a commercial organization is very possible and necessary. All the more so because although VIDEOTON has developed nicely and has achievements we are not well known on western markets as a computer technology firm. Of course, there is not only an advantageous side to the matter. Today, if such a network sells our equipment we must reckon on a profit margin for them of about 40 percent. This is not a path which can be followed for long; certainly we must try to reduce this margin. We can reduce it to a minimum if we have our own organization.

[Question] Can an optimal middle road be found?

[Answer] I do not know if it can be called optimal but this road can be fairly well defined by economic considerations and economic possibilities. According to our plans and according to the expectations of the people's economy our capitalist export must be almost doubled each year. It was 4.5 million dollars in 1978 so the minimum in 1979 must be 7 million, 11 million in 1980. This requirement does not permit us to entrust marketing to an entirely new network of our own, just being born. It would be better to have an agreement with a well known commercial enterprise of the same magnitude as VIDEOTON. Even at the price of giving them 40 percent. But over the longer run--by which I mean at least 5 years--it must be our goal to have an economic share in these enterprises. On the one hand in order to supervise them and on the other hand to be able to reduce the percentage. According to our calculations we would get back half if the entire trade deal were handled by our own enterprise.

[Question] What sort of conditions would have to be created to create such a network, partly your own or, later perhaps, entirely your own?

[Answer] The first is the quality of our products. How modern they are, how good they are. If this were given then the foreign partner would see a deal. We have partners for line printers and displays and we will have partners for our computers in 1979. So the theoretical possibility exists. The rest is mainly a matter of money. At present government organs support partnerships in foreign firms or the building up of closer contacts. There are well known statistics according to which Hungary conducts about 15-20 percent of its non-ruble accounting export through such contacts. And over the past 5 years this 15-20 percent has developed more dynamically, many times more dynamically, I do not know exactly how many times, than the sector based on traditional trade contacs. We have problems despite the support. Under the present rules, if we want to invest abroad, whether in shares or in tools, this is possible in the same way as domestic investment--at the burden of the developmental fund. And recently this has been very limited. It is my understanding that in the near future the National Bank and the Ministry of Financial Affairs will issue new procedural regulations for this. We hope that this will resolve the contradiction. VIDEOTON would require an investment of about 20-30 million dollars to build up networks on FRG and Yugoslav markets, in Austria and France capable of providing a stable base for our marketing. With this we would like to be able to increase our annual dollar export to 30 million dollars.

[Question] How long would this take?

[Answer] The basic goal--and we take this very seriously--is to achieve a foreign exchange balance by 1980. This means that we must produce as much foreign exchange as we use. This means that we must export 10 million dollars in 1980. We want to be net dollar producers in the next five-year plan; this is our obligation to the people's economy. We have calculated that to do this we must produce about 100 million dollars in 5 years. It follows from this that we must reach a minimum level of 20 million dollars by 1985. Our plans aim at an export between 20 and 30 million dollars. We think that this is a just expectation on the part of the people's economy and we must do it. So we do not have too much time. In plain language the network mentioned above must exist on the chief markets by 1981, at least at the level of creating the organizational frameworks.

[Question] That gives you two and a half years. Can any part of this network be seen today?

[Answer] Certainly. Preparations are under way, trusting that our material possibilities will improve. We want to appear first in the FRG. We may form a partnership with a firm which has daughter enterprises in Austria too. We are taking the preparatory steps in Yugoslavia also. To sum up, by the end of 1979 we would like to finish up the FRG and Yugoslavia, leaving France and Austria for 1980. This is a realistic goal.

[Question] Are there outstanding products? Is the trade network functioning? All this is worth nothing if other firms with greater business and production experience offer their goods under more favorable conditions.

[Answer] Let me give you an example. Today both IBM and Siemens are running more than 12 months behind in delivery of displays. If we had displays compatible with IBM and Siemens which we could deliver 6 months from order we would have a great chance on the FRG market. And we can do this.

[Question] So you want to achieve a foreign exchange balance by 1980. What is the situation at present?

[Answer] We include in the foreign exchange balance the productive imports, those machines which we buy in the given year and those license costs which we use. According to preliminary calculations we will pay out about 10 million dollars on these factors in 1980. It follows that our minimum export prescription is 10 million dollars. Let us take 1979. Our export plan is 7 million dollars. We consider this very realistic and our contracts already support this. At the same time, unfortunately, we are using 7 million too. This is unfortunate because probably we will not be able to increase our technological level with 3 million dollar's worth of equipment--because of investment tensions.

[Question] Won't this cause new tensions?

[Answer] Certainly it will. That is our biggest problem, how to resolve these tensions.

[Question] We have talked about this several times. There are certain goals which can be attained, the realization of which is absolutely necessary for further progress. But the realization of these goals depends on the existence or absence of material conditions. And many times the material conditions do not exist.

[Answer] It is obvious that a man can stretch out only so far as his covers reach. The difficulties of the people's economy certainly justify those impediments which have been imposed in the past 2 years. One cannot argue with this. But there is also a realistic possibility of finding solution. Let me give an example, investment. The government is advertising widely that it is giving credits for export development. There are two conditions for this. One is that there be sufficient volume to make the assumption of credit worthwhile. This requires close cooperation contacts on the basis of which we can sell, let us say, 10 million dollars in 5 years. The other condition is that we produce one dollar for less than before. And this is not a simple matter. There are products for which this index is favorable but for which the volume is not. I can only say again that the conditions are difficult but just. And I do not agree with those who whine that we are completely restricted and have no way to develop. There is a way. The government has provided possibilities for development; we must create the conditions to take advantage of these possibilities.

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## DEVELOPMENT OF FIRE PREVENTION, FIRE CONTROL EQUIPMENT REPORTED

Budapest MUSZAKI ELET in Hungarian 10 Aug 79 p 16

[Summary] Growth of the chemical industry -- especially the petroleum processing and petrochemical industries --, increases in the orders of magnitude, the fires and fire catastrophies which have occurred, rightfully pose the question of at what level of efficiency can fire protection, the fire protection technology actively intervene against the increased dangers of fire and fire catastrophies, considering the increases in technology's order of magnitude.

It must be established as a fact that fire protection does have such modern, high performance mobile fire protection technology and fire fighting materials which can be used against the fires and fire catastrophies occurring due to the increases in technology's order of magnitude, which with the use of the properly selected fire fighting methodologies are suitable to provide protection against any fire or fire catastrophy.

Water is among the traditional extinguishing materials of fire fighting. There has been a revolutionary change in the last 20 years in the technology of using water to fight fires. In earlier times only low performance motor vehicles (1,500 liters per minute) and small motorized pumpers (400 to 800 liters per minute) were available for fighting fires with water.

The fire hydrant network operated at 1 to 3.5 atmospheres of pressure. At the present time we have fire engines with 4,800 l/minute or higher capacities, and the fire hydrant systems operate at pressures of 12 to 14 atmospheres.

Earlier the foam extinguishers were built entirely on protein-based foam generating materials, using the tranditional fire protection technologies.

In the past, considering the traditional fire protection technologies and the use of fire fighting materials, construction of larger than 10,000 cubic meter petroleum storage facilities was unimaginable. The fire protection technologies and fire fighting materials could solve the problem of providing fire protection for only this size of storage tanks and their retaining

trenches. Only the fire protection technology and development of fire fighting materials have made it possible that today 60,000 cubic meter storage tanks are being built, with floating roofs. We are planning the construction of 100,000 cubic meter floating roof storage tanks, and we will solve the construction of 100,000 cubic meter or larger capacity double wall, floating roof storage tanks.

The technology and fire fighting materials are available for fire protection needed by the currently built 40,000 to 60,000 cubic meter floating top storage tanks. We have such mobile fire fighting motor vehicles which have capacities of 4,800 l/minute, the performance capacities of the monitors used on them is 2,400 to 6,000 l/minute. We have a fire hydrant network operating at 12 to 14 atmospheres, from which 3,600 l/minute monitors [pumpers] can be operated directly. We have such a synthetic foam generating material for fighting fires of hydrocarbon storage tanks and their retaining trenches, with which we can count on 2 to 5 minute timing instead of the earlier 20 minutes; in addition, while a fire with a maximum of 3,600 square meters could be put out in those 20 minutes, we now calculate putting out fires of 12,000 to 15,000 square meters of surface area.

Until the most recent times only the protein-based heavy foam was used exclusively for petroleum storage tank fires, and the foam had to be spread on the fire's surface with 1,500 l/minute capacity foam distributors. The present extinguishing technology is that putting fires out in the large surface-area retaining trenches of the hydrocarbon storage tanks, the surface area must be sectioned with high performance foam-water monitors, with light water [the English phrase "Light Water" is repeated], then the already extinguished surface area must be covered with large quantities of medium-efficiency foam.

Gas turbine operated turboreactive motors have been developed for extinguishing fires in gas and oil wells. It is characteristic of the extinguishing capabilities of turboreactive motors -- which we did not have before --, that they can effectively extinguish in 2 to 4 minutes even those fires which occur in gas well blowouts at 200 atmospheres of pressure. Special blowout-extinguishing professional fire fighting brigades have been organized to put out gas well fires, and appropriate training fields have been built to practice extinguishing gas well and oil well fires.

It can be said as evaluation that in the area of the petroleum and gas industry the necessary and modern fire fighting technology and extinguishing materials are available.

Modern mobile fire protection technology and extinguishing materials are also available for localizing and extinguishing fires and fire catastrophies which may occur in the petrochemical industry and in other areas of the chemical industry. It should be mentioned that even for the tank trucks transporting ethylene, which is commonly known to be very dangerous, the automatic flare system has been developed which is suitable for immediately

preventing even the most critical situations by placing the flare system into operation in the case of a truck with a defective tank, enabling us to localize the fire which may break out.

We are showing a few modern fire protection techniques on our pictures, without any efforts to be complete.

The arsenal of technical weapons with which the fires and fire catastrophies which may occur in the chemical industry can be prevented or localized, cannot even nearly be seen in the pictures.

It must be established as a fact that the fire protection technology and the extinguishing materials -- parallel with the advance of technology -- used in protecting against fires are very expensive, but they must be provided under all circumstances in the interest of protecting the working man. We are pleased to be able to conclude that these high performance, modern fire protection technologies and fire fighting materials are made available in the area of the chemical industry.

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DEFLAMMA, HUNGARIAN FLAME-PROOFING SUBSTANCE DESCRIBED

Budapest MUSZAKI ELET in Hungarian 10 Aug 79 p 21

[Article: Hungarian Inventions -- "Deflamma Flame Proofing Compound"]

[Text] Besides very significant material damage, occasions of fire caused by carelessness, technical problems or self-ignition can also often endanger human lives. As an example, we could mention the case of fire which occurred recently in a school and apartment complex. The construction authorities and fire prevention organs require the investors and operators to observe very strict requirements. Besides this, we also have available to us very many and mainly efficient fire extinguishing and fire preventing tools.

Making the materials flameproof, or making them self-extinguishing is one of the significant tools of preventive fire protection. The flameproofing materials in the past have been very effective, but in general they exert their effects in only a relatively narrow temperature range, thus their use is limited.

Generally speaking, the development of flameproofing chemicals is progressing in the direction of complicated and expensive organic, synthetic materials. Primarily the halogen-containing phosphates have been used, which during the combustion reaction exert their effects by means of a "radical-capturing" mechanism. General and broad-based use of these active materials is hindered also by the fact that they are expensive. Thus they can be used economically only in narrow areas, to protect expensive materials, establishments and for the personal protection of people working in special work areas. The other group of flameproofing materials is made up of those materials which generate noncombustible gases during the combustion reactions, or form a layer on the burning material which blocks out air, thus concealing the material from the oxygen necessary for burning.

Until now the materials mentioned have been used for flameproofing and for fire retardation only by themselves, and only with low efficiency, because after exceeding their characteristic temperature ranges they became practically ineffective.

Ferenc Szabo and his group composed of chemical engineers has experimentally developed and obtained a patent for an inexpensive material composition which prevents and extinguishes fires, can be applied simply and without professional expertise, and is suitable for a broad range of uses. The inventors prepared a composition out of materials which have already been used for similar purposes, but which were effective only in narrow temperature ranges. Individually these materials exert the combustion-hindering effect from 58 degrees C to 430 degrees C by their oxygen-excluding, free radical capturing effect. The composition according to the invention exerts perfect flameproofing and combustion preventing effect over a very wide temperature range, from 58 degrees C to 1,500 degrees C, which in practice includes almost the entire scale of combustion temperatures of the materials used, and prevents with complete security any fires from starting at all points of the designated temperature range, as well as the spreading of an already burning fire.

The excellent effect of the composition baptized "Deflamma" comes into existence through the fact that its components and their decomposition products enter into reactions with each other and form a series of such compounds among which at least one compound can always be found from 58 to 1,500 degrees C which generates a combustion-hindering gas and forms an air-excluding material at the given temperature. The active organic radicals generated during the thermal combustion become deactivated by the ions derived from the decomposition of the flameproofing composition. During the energy-consuming processes the resulting heat of the entire combustion reaction shifts towards the endothermic region.

By changing the ratio of the materials which make up the compositions, the decomposition activity and the temperature limits can be changed in accordance with the requirements of each case, and thus special modifications of the compound can also be developed. Based on its advantageous and well specifiable characteristics it can be excellently applied in preventive fire protection as well as in actual fire fighting.

Fibrous, stringy, micellous, porous materials (paper, wood, textile, plastics, etc.) can be impregnated with suspensions and dispersion systems of Deflamma solutions. Other combustible structural materials can also be protected by it by surface coating. It can be used in deposits of combustible materials and materials with spontaneous combustion tendencies, or near these in the form of "local packages", thus among other things it can provide effective protection for heating materials, agricultural products and other fire-hazardous materials against spontaneous combustion.

It can be used very well in active fire fighting also: the efficiency of equipment using powder, water or foam for extinguishing can be increased with it. But it can also be used for blocking in fire areas, to prevent the spreading of fire.

The official evaluating organs have already qualified the composition in the patent as adequate. Production of Deflamma has also been accomplished already on the commercial scale, by a production unit which has the present capacity of about 100 tons per year, but in accordance with the demands the capacity can be further expanded. The inventors have appointed the NOVEX RT [expansion unknown] to sell the very effective and inexpensive flameproofing and fire extinguishing material which does not require significant expenses even for the protection of smaller values and does not need special application technology.

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